Highlights of Integrated Resource Management In Alberta — Year 2000

Alberta
GOVERNMENT OF ALBERTA

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Introduction

In 1999, the Alberta Government reaffirmed its commitment to sustainable resource and environmental management with the policy *Alberta's Commitment to Sustainable Resource and Environmental Management*. This policy reiterates the government's vision of a healthy environment, economy and quality of life for present and future generations. The policy's implementation plan suggests a shared vision, provincial direction and highlights the importance of a fair and effective decision-making process as well as an up-to-date legislative/ regulatory regime[1].

The Alberta Government identified Integrated Resource Management (IRM) as one of the means to implement the policy[2]. Considerable recent interest (and associated findings) in integrated management issues from the public at large, the research community and corporate perspectives suggest that IRM has a renewed beginning and should be revisited in the public policy and resource management arenas. For example, a present IRM effort could benefit and differ from previous approaches by encompassing cumulative effects assessments, ecosystem management findings and contributions associated with sustainable development discussions.

Alberta, a member of the global community, is a leader in sustainable development, ensuring a healthy economy and a high quality of life in the present and future — Alberta Round Table on the Environment and Economy, adopted by the Alberta Legislature, 1992.

The IRM approach currently envisioned will also strive to accomplish improved coordination, streamlined decision-making processes and a clarification of policy, legislation and process at all levels so independent management initiatives, considered a necessity for resource management, can succeed.

To conduct and implement IRM, the Sustainable Development Coordinating Council (SDCC[3]) suggested the involvement of four departments; Alberta Agriculture, Food and Rural Development, Alberta Economic Development, Alberta Resource Development and led by Alberta Environment. They recommended that a responsible management group (the Integrated Resource Management Division of Alberta Environment) be created to ensure the effective delivery of IRM. However, it is also recognized that corporate IRM initiatives have much to offer and therefore have an important role to play in the implementation of IRM.

From approximately 300 recent relevant projects, this report attempts to highlight different or unique IRM initiatives that occurred in Alberta during 1999-2000 (see map on page 2). It also gives an update on components of the approach Alberta has taken to implement IRM.

It is hoped that the report will provide an opportunity to see the wide variety of initiatives currently underway and that it will assist to sustain the development of IRM in the province. The report will cover IRM examples as well as the various components of the current IRM approach — public involvement and communication strategy, monitoring initiatives, research initiatives and incorporation of IRM into business plans. It provides a brief description of each initiative, the features that make it unique and contact information.

The use of IRM will grow. IRM is about looking into the future, anticipating consequences and providing our children with the same opportunities and quality of life that we have enjoyed.

1 *Alberta's Commitment to Sustainable Resource and Environmental Management — Implementation Plan*

2 *Alberta's Commitment to Sustainable Resource and Environmental Management*

3 *Sustainable Development Coordinating Council (SDCC): Deputy Ministers of: Environment; Agriculture, Food and Rural Development; Resource Development; Economic Development; Municipal Affairs; Health and Wellness; Infrastructure; International and Intergovernmental Relations; and Head/ Chair of: Alberta Energy and Utilities Board; Alberta Science, Research and Technology Authority; Natural Resources Conservation Board*

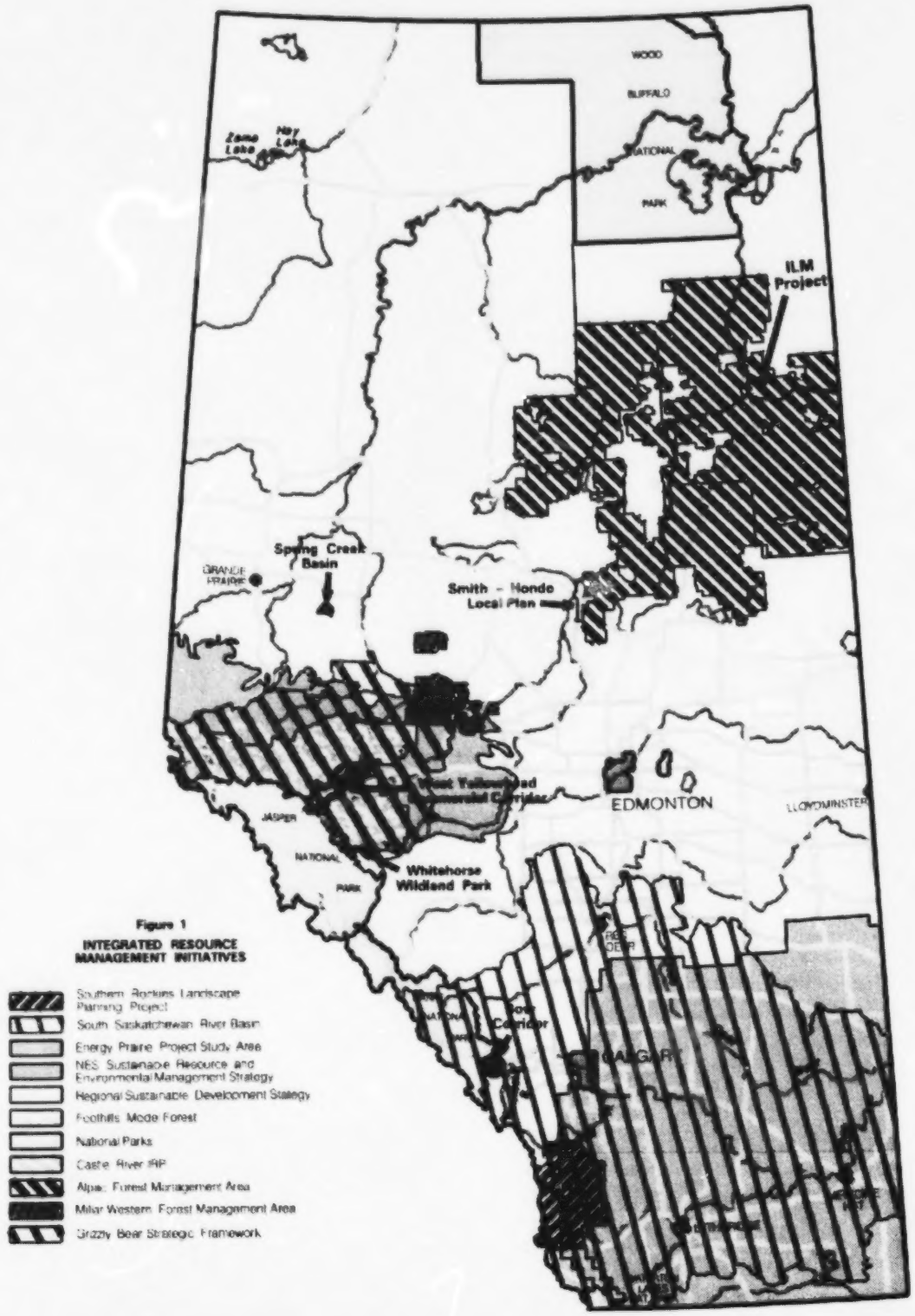

Figure 1
INTEGRATED RESOURCE MANAGEMENT INITIATIVES

Integrated Resource Management

IRM is an interdisciplinary and comprehensive approach to decision-making for natural resource management. This approach integrates decisions, legislation, policies, programs and activities across sectors to gain the best overall long-term benefits for society and to minimize conflicts. It recognizes that the use of a resource for one purpose can affect both the use of that resource for other purposes and the management and use of other resources.

IRM is based on:

- cooperation, communication, coordination and the comprehensive consideration of all resource values; and
- consultation before action.

In practice, IRM strives to achieve a comprehensive and integrated consideration of resources within management strategies. Other attributes it encompasses are flexibility; consultative, fairness, knowledge-based and result oriented procedures; accountability and clarity. It is thought that these attributes could be used in an assessment of IRM.

Why IRM (again)?

The natural environment is complex and "everything is connected to everything else." Similarly, resource use, users and their governing agencies all affect one another. We cannot achieve the vision of environmental, economic and social sustainability without recognizing that interconnectedness in our management.

Earlier implementation of IRM, while useful in planning contexts, had more limited application elsewhere and was more limited in scope. Recent contributions from the resource science information base should allow a different and enhanced approach to resource management policy and strategy.

Progress to date...

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- The creation of the Integrated Resource Management Division (IRMD) within Alberta Environment on April 1, 1999.
- Recognition that today's level of resource use and conflict demand a more integrated approach that addresses cumulative effects.
- Existence of research and pilot projects that address IRM (or associated issues) on various spatial and temporal scales.
- Strong, high-level support for integration (at Cabinet through *Alberta's Commitment to Sustainable Resource and Environmental Management*, and at SDCC).
- Public support for the sustainable management of resources.
- Industry demand for greater regulatory certainty and willingness to integrate their operations with one another.
- Recognition that decision-makers expanded responsibility to look at the big picture and consider all interests does not need to result in a diffusion of accountability.
- The emergence of and increased emphasis on ecological considerations ("ecosystem management" theory) in resource management agencies. This management philosophy requires consideration of issues from a variety of sectors, pertaining to society and resources.

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IRM Examples: Regional Strategies

Background Information

Through much of the 1990s, the Alberta government has been rethinking planning systems for management of natural resources, including land and water. Increasing levels of resource use are resulting in greater conflict between resource users. The cumulative effects of activities are not being fully addressed through incremental management and approval processes or by local planning.

The evolving concepts of ecosystem management and landscape ecology emphasize the importance of regional and landscape-scale processes, and the need to address such issues at similar scales.

Alberta's Commitment directs government to focus its planning effort at broad, strategic levels to define goals and expectations, while resource users should be charged with designing how best to meet those expectations. It supports development of government-led, broad-scale plans for public land, water and other public resources, which we are now calling "regional strategies." Regional strategies should interpret provincial policy for the needs and circumstances of the very different regions across the province. They should set the context for more detailed planning and for assessment and approval of specific project proposals. Regional strategies will cover large areas, will address cumulative effects, issues such as biodiversity, airsheds and the resource dependence of a regional economy.

British Columbia and Ontario have completed or are in the process of completing regional strategies. Most other provinces are applying Integrated Resource Management at the subregional and local levels.

Provincial Framework

Each regional strategy must be tailored to the needs and aspirations of the specific region. At the same time, there is a need for some consistency in approach and commitment across the province.

A "provincial framework" guidance document will provide the appropriate level of consistency and flexibility to the developers of strategies in different parts of the province.

Each regional strategy must be tailored to the needs and aspirations of the specific region. At the same time, there is a need for some consistency in approach and commitment across the province. A provincial framework is being designed to assist those people developing regional strategies and to provide an appropriate balance of consistency and flexibility when applied to different parts of the province. It is built upon past planning experience in Alberta and elsewhere, ongoing experience from the Athabasca Oil Sands Regional Sustainable Development Strategy and Northern East Slopes prototype described below.

"There is a broad consensus out there that something needs to be done and done now... and that government should take the initiative." (quote from the IRM workshop held December 1999).

IRM Examples: Regional Strategies

1. Regional Sustainable Development Strategy for the Athabasca Oil Sands Area

In 1998, because of the anticipation of further oil sands resource development in Northern Alberta, a Regional Sustainable Development Strategy (RSDS) for the Athabasca Oil Sands region was initiated. Staff of the Northeast Boreal Region of Alberta Environment led the development of the RSDS, with a strong partnership involving regional stakeholders, Aboriginal representatives and regulators.

The RSDS, which is now being implemented, was guided by government policy and is consistent with provincial and national commitments to sustainable development and biodiversity. Its focus is to manage the cumulative environmental effects of surface-mineable oil sands development along with other human activity.

The IRMD will continue to build on the experience gained with RSDS and will continue to work with staff from the Northeast Boreal Region to learn from their experience, offer advice to them and other regions and ensure that regional strategies are consistent with each other.

The following five steps are included in the RSDS process:

- describe and improve coordination of current activities;
- analyze gaps in science and knowledge;
- direct research to fill gaps;
- set goals, thresholds and targets; and
- ensure implementation of effective monitoring, communication and decision-making.

Progress to date...

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- Consulting with an existing network of stakeholders is effective and saves time.
- The process of issue identification and resolution is working well and must continue.
- The RSDS had a fixed timeline with a flexible end point that met expectations.
- The RSDS identified the need for regional goals and objectives.
- The RSDS defined issues and assigned them priorities for action.
- Regional strategies help deal with cumulative effect issues.
- The RSDS was completed in July 1999.
- The implementation phase has begun.

Figure 2. Forest regeneration on a typical logged mixedwood site in Alberta.

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2. Northern East Slopes Sustainable Resource and Environmental Management Strategy

The Northern East Slopes Sustainable Resource and Environmental Management Strategy is a follow-up to the RSDS (see above), which identified an IRM framework and *Alberta's Commitment to Sustainable and Environmental Management*. These were complimentary developments given their timing, and the NES Strategy (Northern East Slopes Sustainable Resource and Environmental Management Strategy) was deemed important for continued progress in the development of IRM strategies.

The NES Strategy is also a prototype for regional IRM strategies, initiated and currently directed by the Alberta Government. This program envisions the creation of a regional vision of resource management with goals and indicators; a scope that encompasses economy, environment and social interests; and a monitoring system to adaptively enhance the overall approach over time.

A Terms of Reference has been completed and will direct the process used to develop the natural resource management direction for the study area located in west central Alberta (Appendix A). Approximately two years is anticipated for the production of the final strategy document. An overview of the strategy development framework is given in Appendix B.

Progress to date...

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- Initiated in June 1999.
- A diverse group of industry, government and community participants reviewed and commented on a draft Terms of Reference in November and December 1999. The final Terms of Reference contains revisions based on the comments received.
- An interdepartmental committee of Assistant Deputy Ministers approved the Terms of Reference on February 14, 2000.
- The Terms of Reference was endorsed by SDCC on March 29, 2000.
- The strategy will be lead by a group consisting of appointed community members, Aboriginal representatives, a municipal government representative and representatives of provincial and federal government agencies.

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IRM Examples: Operational Integration Pilots

Following are specific examples that illustrate the operational aspects of integrated resource management to encourage its continued development in various sectors. These projects are currently underway or in planning stages. The range of sectors depicted is diverse, spanning water, resource development, land development (agriculture, forestry) and mineral (oil and gas) activities. These examples describe what has been done to accommodate the management of a particular resource from an IRM perspective. The first examples pertain to oil and gas and forestry activity. Subsequent examples pertain to water management projects and others following these deal largely with accommodation of wildlife and fisheries issues as well as tourism development. The final examples pertain to the non-forested landbase and include agricultural activity. Solutions vary with setting.

1. ILM projects: Al-Pac-Gulf access management

Over the last year, Alberta Pacific Forest Industries (Al-Pac), in association with Gulf Resources has developed an Integrated Landscape Management (ILM) program to reduce the footprint of the two resource users in the Northeast part of Alberta. Gulf is developing the heavy oil resources of the area; Al-Pac has the logging rights.

By jointly planning road access and forest regeneration, the companies can significantly improve the regeneration of Alberta's forestlands while reducing the access needed for resource development.

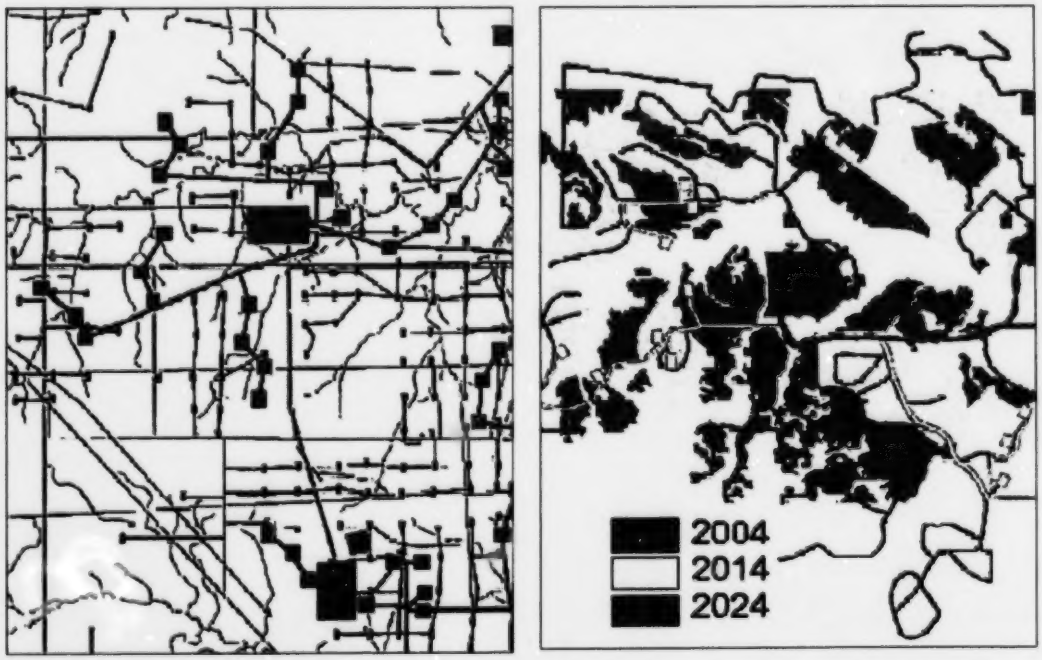

Figure 3. Infrastructure development with (right) and without (left) using an integrated approach. Roads are depicted with straight lines (left side) and curved lines (some double) on right side.

IRM Examples: Operational Integration Pilots

Progress to date...

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- The Alberta Chamber of Resources has shown considerable interest in the project.

2. Detailed Forest Management Plans

IRM principles are used in the forest industry. During the (mandatory) preparation of detailed Forest Management Plans, firms hold public sessions to identify land management issues and to develop management and monitoring strategies. Sophisticated modelling systems are used to examine (among other items) long-term projections of timber supply, spatial layout of proposed harvesting blocks, access routes, availability of wildlife habitat, watershed quality and scenic quality (of harvest layouts). Research programs that address these areas have also been sponsored.

Measures that assist in accomplishing integrated management objectives at the operational level include the following:

- Site specific harvest planning to accommodate the integrity of riparian zones.
- The use of temporary (winter only) access to accommodate specific species habitat management considerations (i.e., woodland caribou summer range).
- Residual patterns (tree leave patterns) on recently harvested blocks to encourage regeneration and habitat restoration through the emulation of vegetation regeneration patterns created by naturally occurring fire.
- Minimizing overall potential disturbance by coordinating access development plans with other forest operators (oil and gas), a measure that has been pursued in the past.
- Sharing management operations and responsibility with other forest operators, to optimize forest resource use (when more than one operator is on the landbase, efforts are made to maximize wood use or efficiency by using the same operating plan).

Progress to date...

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- Numerous public information sessions were held to resolve biodiversity, watershed, Aboriginal land use, archaeological concerns, accompanying management approaches and adaptive management/monitoring strategies (Weyerhaeuser Canada).
- Loss risk due to insect and disease, fire and abiotic agents incorporated into Weyerhaeuser Canada Annual Allowable Cut.
- In one case, there are coordinated operations between a deciduous forest operator (Ainsworth) and a coniferous operator (Weyerhaeuser Canada). This requires the sharing of access plans and harvesting plans on a mixedwood landbase.
- Assessment techniques like the "Biological Assessment Program" (Figure 4); this tracks water yield, forest health, biodiversity (coarse filter approach and fine filter [17 species] approach), timber supply, heritage values (archaeological sites), rare plants, soil risks, atmospheric carbon and endangered species. Landscape processes (fire) are also incorporated in fire smart landscape planning systems. Assessments also include socio-economic profiles (Millar Western).

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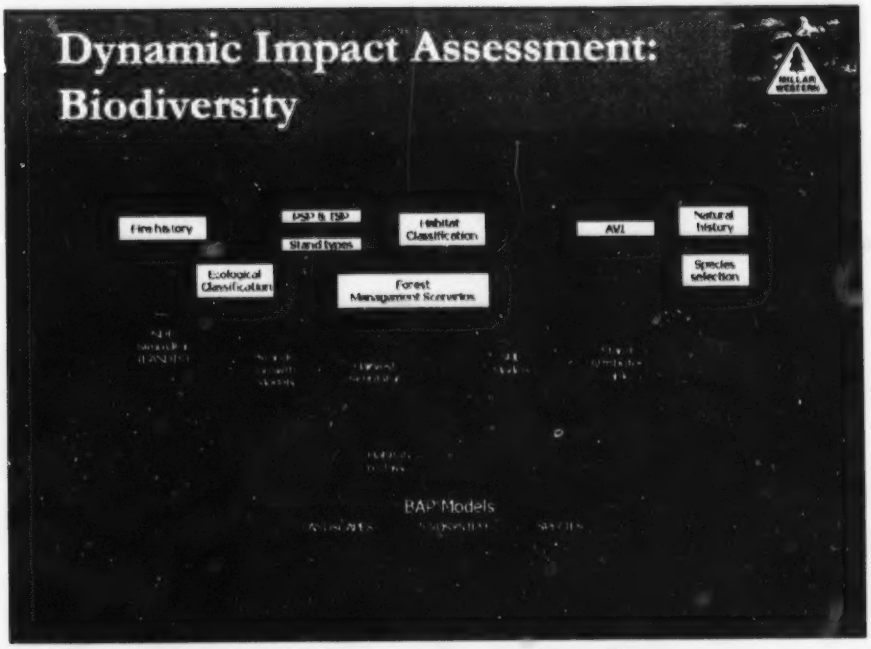

Figure 4. Structure of the "Biological Assessment Program", Millar Western Forest Industries, Whitecourt.

3. Alberta Water Management: Highwood Management Plan, Year 2000 Review

A draft Terms of Reference for a water management plan, including the Highwood River basin, upper Little Bow River basin and lower Mosquito Creek basin, will include public sessions that will seek to resolve a series of issues surrounding water management activities in the area.

The alternatives that will be explored are as follows:

- different water management plans and associated water availability to aquatic environments (as projected with models);
- habitat requirements issues (i.e., riparian habitat, fisheries requirements);
- water quality (toxicology) issues;
- neighbouring land use (livestock) interaction; and
- the implications of water conservation strategies to the overall plan.

Similar assessments of instream needs (consumptive and ecological water requirements of the South Saskatchewan River basin) as well as other needs, such as municipal, industrial and agricultural, will be done in the Year 2000 Review. This will be accomplished through a Basin Advisory Committee and will include a consultation process involving provincial departments (Agriculture, Food and Rural Development and Environment) and stakeholders from various sectors. The scope of these assessments is in harmony with the most recent version of the *Water Act* and water management framework, which suggest a broader perspective be taken in water projects. The outcome of the Year 2000 Review will also be of significance to other water management projects under the new *Water Act*.

IRM Examples: Operational Integration Pilots

Progress to date...

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- Instream needs assessment process for water management projects.
- Broader scope in water management planning, encompassing economic, ecological and sustainability aspects of water use – water conservation strategies are included.
- Terms of Reference have received Ministerial approval.

4. Red Deer River Corridor Integrated Management Plan

The Red Deer River Corridor Integrated Management Plan (IMP) is an integrated resource plan for the river valley from just west of Sundre to the Saskatchewan border.

Two features of this plan make it a unique undertaking:

- a very strong partnership was developed between municipalities and the Interdepartmental Planning Team to coordinate land/resource use policies between provincial and municipal jurisdictions; and
- the plan merged components of both land and water planning.

The collaborative planning process was facilitated through the creation of a Local Authorities Committee (LAC) (representing 15 municipalities along the river) that worked closely with the Planning Team. This planning strategy was required to ensure that provincial and municipal land use objectives could be as complementary as possible, particularly in light of the extensive private land holdings within the planning area.

Water and land planning components were first merged when the Instream Flow Needs study was brought into the IMP planning initiative. Although the original intent was to include both Instream Needs and Interim Instream Objectives in the IMP, the Instream Objectives component was deferred to the *Year 2000 Review of Water Management in the South Saskatchewan River Basin.* Instream Needs data collected for the IMP process is now being used to support this larger and complementary water planning initiative.

Progress to date...

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- The final round of public consultation was held on the draft plan.
- The draft plan was endorsed by the LAC and approved by the ERC.
- The IMP was approved for implementation by the Parkland and Bow Environmental Resource Committees in March 2000.
- Communications approval is underway and will be followed by the printing and distribution of the plan.

Figure 5. Typical stream crossing for road in forest setting: a management practice used on watercourses in Alberta.

IRM Examples: Operational Integration Pilots

5. Human Use within Wildlife Corridors – Bow Corridor

Intense land use pressures, projected urban development and the need to ensure wildlife habitat requirements in the Bow Valley reiterate the need to continue to pursue integrated resource management strategies. Following a series of public sessions, the Human Use Group of the Bow Corridor Ecosystem Advisory Group (BCEAG), consisting of participants from the Municipal District of Bighorn, Town of Banff, Town of Canmore, Banff National Park and the Alberta Government developed trail use guidelines.

Progress to date...

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- Development of trail use guidelines that allow maintenance of habitat patch size and movement corridors for wildlife species including cougar, bear, elk and wolves.

6. Fisheries and Recreation: Kananaskis River Assessment

To identify opportunities for fisheries and recreation enhancement within river systems affected by hydroelectric development, the Fisheries and Recreation Enhancement Working Group has been created. Partners are Trout Unlimited, TransAlta Utilities, Parks Canada, Department of Fisheries and Oceans and Alberta Environment (NRS). The group examines current fisheries and recreation issues, develops management objectives, options and management strategies and will implement, monitor and evaluate approved strategies.

Progress to date...

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- Detailed studies have been conducted to assess options for the Kananaskis River system.

7. Hay-Zama Lakes: Well Site Development Monitoring

The Hay Zama Wetland is a large wetland complex that has been recognized internationally by the United Nations Ramsar Convention, nationally as a Wetlands for Tomorrow site and provincially as a Provincial Park. The Hay-Zama Committee (EUB, Ducks Unlimited, Alberta Wilderness Association, World Wildlife Fund, First Nations and government) is monitoring the orderly, economic and efficient depletion of hydrocarbon resources within the wetland pursuant to ID 96-1. ID 96-1 is an EUB directive that was negotiated by Alberta Energy, Alberta Environmental Protection and the EUB. It contains measures to reduce the likelihood of a major spill and to minimize the magnitude of waterfowl mortality that may result. The ID also encourages the rapid depletion of the hydrocarbon resources.

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IRM Examples: Operational Integration Pilots

Progress to date...

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Website: http://www.env.gov.ab.ca/env/water.html

- Instream needs assessment process for water management projects.
- Broader scope in water management planning, encompassing economic, ecological and sustainability aspects of water use – water conservation strategies are included.
- Terms of Reference have received Ministerial approval.

4. Red Deer River Corridor Integrated Management Plan

The Red Deer River Corridor Integrated Management Plan (IMP) is an integrated resource plan for the river valley from just west of Sundre to the Saskatchewan border.

Two features of this plan make it a unique undertaking:

- a very strong partnership was developed between municipalities and the Interdepartmental Planning Team to coordinate land/resource use policies between provincial and municipal jurisdictions; and
- the plan merged components of both land and water planning.

The collaborative planning process was facilitated through the creation of a Local Authorities Committee (LAC) (representing 15 municipalities along the river) that worked closely with the Planning Team. This planning strategy was required to ensure that provincial and municipal land use objectives could be as complementary as possible, particularly in light of the extensive private land holdings within the planning area.

Water and land planning components were first merged when the Instream Flow Needs study was brought into the IMP planning initiative. Although the original intent was to include both Instream Needs and Interim Instream Objectives in the IMP, the Instream Objectives component was deferred to the *Year 2000 Review of Water Management in the South Saskatchewan River Basin*. Instream Needs data collected for the IMP process is now being used to support this larger and complementary water planning initiative.

Progress to date...

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- The final round of public consultation was held on the draft plan.
- The draft plan was endorsed by the LAC and approved by the ERC.
- The IMP was approved for implementation by the Parkland and Bow Environmental Resource Committees in March 2000.
- Communications approval is underway and will be followed by the printing and distribution of the plan.

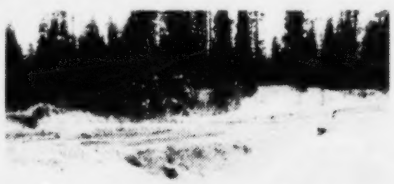

Figure 5. Typical stream crossing for road in forest setting: a management practice used on watercourses in Alberta.

IRM Examples: Operational Integration Pilots

5. Human Use within Wildlife Corridors – Bow Corridor

Intense land use pressures, projected urban development and the need to ensure wildlife habitat requirements in the Bow Valley reiterate the need to continue to pursue integrated resource management strategies. Following a series of public sessions, the Human Use Group of the Bow Corridor Ecosystem Advisory Group (BCEAG), consisting of participants from the Municipal District of Bighorn, Town of Banff, Town of Canmore, Banff National Park and the Alberta Government developed trail use guidelines.

Progress to date...

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- Development of trail use guidelines that allow maintenance of habitat patch size and movement corridors for wildlife species including cougar, bear, elk and wolves.

6. Fisheries and Recreation: Kananaskis River Assessment

To identify opportunities for fisheries and recreation enhancement within river systems affected by hydroelectric development, the Fisheries and Recreation Enhancement Working Group has been created. Partners are Trout Unlimited, TransAlta Utilities, Parks Canada, Department of Fisheries and Oceans and Alberta Environment (NRS). The group examines current fisheries and recreation issues, develops management objectives, options and management strategies and will implement, monitor and evaluate approved strategies.

Progress to date...

Contact: Robert E. Morrison
Dept/Co: Alberta Environment
Phone: (403) 297-6462
Email: RobertE.Morrison@gov.ab.ca

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IRM Examples: Operational Integration Pilots

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8. Grizzly Bear Conservation in the Yellowhead Ecosystem – A Strategic Framework

Grizzly Bear Conservation in the Yellowhead Ecosystem — A Strategic Framework (the Strategic Framework) is a collaborative approach between Jasper National Park and Alberta Environment for the conservation of grizzly bears in the Alberta-Yellowhead ecosystem. The Strategic Framework was developed over a two-year period in full consultation with government, industry and public stakeholders in the study area and is committed to the establishment of suitable landscape conditions to ensure the continued presence of grizzly bears on the landscape. These landscape conditions will be developed based on research currently being carried out in this area and vetted by a Regional Carnivore Management Group (RCMG) which will include representation from government and industry. The RCMG will be responsible for implementing the management directions outlined in the Strategic Framework and submitting them for approval and adoption by land and resource managers in the region.

Grizzly bears are considered an excellent indicator of ecosystem integrity. The species is wide ranging and is sensitive to development and other human use pressures. Grizzly bear populations often range across multiple jurisdictions and an integrated management approach is required to ensure their long-term persistence.

Progress to date...

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Email: Andy.Lamb@gov.ab.ca

- Management of grizzly bears in the Canadian Rockies has focused on research to learn more about the species habitat and behaviour. The Strategic Framework strives to translate the data collected from intensive research programs into management objectives that will help to ensure the continued persistence of the species.

9. West Yellowhead Corridor Commercial Tourism and Recreation Development Project

In 1996, the Northern East Slopes Environmental Resource Committee (ERC), consisting of Alberta Environment, Alberta Resource Development, Alberta Infrastructure and Alberta Economic Development identified a need to develop a planned approach to commercial tourism and recreation development on public lands along Highway 16.

To accomplish this, a working partnership was created among the organizations that had resource management obligations in the Yellowhead Corridor. The Extended ERC was struck, consisting of Yellowhead County, the Town of Hinton, Weldwood of Canada, Alberta Economic Development, Alberta Resource Development, Alberta Infrastructure and Alberta Environment.

The Extended ERC formed the West Yellowhead Corridor Working Committee (WC) to work on their behalf to create an integrated planning and approval process agreement.

IRM Examples: Operational Integration Pilots

The WC identified and created nine development modes that are suitable for development within the Corridor and established a Memorandum of Understanding (MOU) between the partners on how future Commercial Tourism and Recreation developments on these public lands would be managed.

Progress to date...

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Email: Andy.Lamb@gov.ab.ca

- The MOU process directs future commercial tourism and recreation development leases within the Corridor to the nodes, which are in close proximity to existing infrastructure. The MOU process integrates the provincial leasing and municipal development approval processes. The MOU sees Forest Management Agreement (FMA) holders agreeing to allow withdrawals from their FMA provided that the lease applicant enters into a Disposition Withdrawal Agreement and compensation is paid to the FMA holder. The province, therefore, is not required to withdraw lands designated for the nine development nodes from within the FMA all at once, and compensating the FMA holder directly. Lease applicants will also be required to obtain consent from existing surface disposition holders where applicable.
- The four Alberta Government departments continue to work collaboratively and share resources to see the implementation of the project. The benefits are far reaching for the province, our partners and the community.

10. The Whitehorse Wildland Park Management Plan

In August 1998, the Whitehorse Wildland Park was designated, which enlarged and reclassified the existing Cardinal Divide Natural Area and the Cadomin Cave Candidate Natural Area. With the designation of such a large area, Alberta Environment felt the need to develop a management plan, which would provide direction for the protection and use of Whitehorse Wildland Park. Specific management objectives were developed to include the involvement of key stakeholders in the management of the Wildland Park.

In January of 1999, the Whitehorse Wildland Park Advisory Group was established. Members included representatives from Alberta Environment, Jasper National Park, Yellowhead County, the Town of Hinton, Cardinal River Coals and several outdoor and environmental organizations. After formulating and approving the Terms of Reference, the Advisory Group worked closely with Alberta Environment to develop a draft management plan for the Whitehorse Wildland Park. Copies of the draft management plan were made available to members of the public and those interested were asked to provide comments and suggestions directly to Alberta Environment during several local open houses.

Progress to date...

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- Whitehorse Wildland Park protects a wide variety of vegetation, special terrain features, wildlife habitat and corridors essential for the continued survival of grizzly bears, other carnivores and ungulates.

IRM Examples: Operational Integration Pilots

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- Whitehorse acts as a recreation destination for hikers, backpacker, trail riders, cyclists and off highway vehicle users.
- This area is an important compliment to the Rocky Mountain protected areas network.

11. Alberta Prairie Conservation Forum

The Prairie Conservation Forum (PCF) is a venue for consultation and implementation of the Prairie Conservation Action Plan (PCAP), which in turn is the result of a large collaborative exercise that focuses on prairie conservation initiatives. The forum has four functions — to assist with implementation of the PCAP, to facilitate information exchange, develop communication networks and to provide public education. These functions are administered through a chair, steering committees, subcommittees and local committees.

The four general goals of the PCAP are to:

- acquire better information about prairie ecosystems;
- ensure that all three levels of government have policies in place, which favour conservation of prairie ecosystems;
- adopt ecosystem land use practices and protective strategies across the entire landscape, not just at selected sites; and
- increase public awareness and support for the values and importance of prairie ecosystems.

Progress to date...

Contact: Ian Dyson
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Website: http://www.albertapcf.ab.ca

- Various public sessions have been held.
- PCF sponsored research on various prairie topics.
- PCAP, now in its second release.
- More than 40 different organizations and agencies are currently represented on the Forum.
- The founder of the PCF, Ian W. Dyson, received an Alberta Emerald Award in 1999.
- Two PCF occasional papers have been developed: *The Rules of the World* and *Prairie Ecosystem Management: An Alberta Perspective*.
- The interdisciplinary course *Topics in Prairie Conservation* is being offered for the third consecutive year at the University of Lethbridge.
- An Alberta PCAP/PCF web site has been developed to provide readily accessible information.
- The Prairie Ecology Research Committee was established to promote a better understanding of prairie ecology and the improved management of resources, habitats and species occurring on the prairie landscape.

12. Energy Prairie Project

To ensure that disturbance of native prairie by energy development activity is minimized, the Native Prairie Guidelines Working Group (Energy and Utilities Board; Alberta Agriculture, Food and Rural Development; Alberta Resource Development; Alberta Environment and the Special Areas Board) is updating operating guidelines (from EUB Information Letter (IL) 96-9). These apply to seismic operations, pipelines and drilling and production activity.

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- provide clear, consistent and integrated standards for use by industry undertaking development in the native prairie.

IRM Examples: Operational Integration Pilots

Conservation of prairie ecosystems enhances the potential for other land use activities (i.e., grazing) and minimizes other impacts as well as subsequent construction and vegetation re-establishment costs. Conservation is also important to protect the biodiversity of the endangered prairie habitat environment. The guidelines encourage operators to minimize disturbance on native prairie so it can be restored to its original function.

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- Update of previous guidelines for these activities (EUB IL 96-9) in progress; anticipated completion of the revised IL is December 2000.

13. White Area Forested Public Land and IRM in Fringe Agricultural Areas

To encourage the implementation of IRM on marginal agricultural lands, overall responsibilities for issue resolution and decision-making has been reviewed. The discussion paper entitled *White Area Land Manager Role and Integrated Resource Management* gives an overview.

The framework for decisions raises interesting opportunities for resource management, because issues could be approached differently. A first example is an alternative perspective on public forested land (i.e. "woodlots") in the White Area, which in part is associated with the recent enhancement in the economic potential of their management.

The White Area Public Forest Strategy (see below) also has implications for marginal lands and White Area forested land management.

The White Area Public Forest Strategy involves timber on White Area public land managed by Agriculture, Food and Rural Development (AFRD) and focuses on integrating agriculture and forest resources. It is recognized that before resource allocation can take place, the range of economic, social and environmental benefits Albertans value must be assessed on White Area public land.

AFRD will lead this initiative with Alberta Environment and Alberta Resource Development to develop an overview of White Area public timber resources, commitments, demands, and public values. This will be designed to support regional strategies and sub-regional operational plans. It has been further recognized that this may develop new timber allocation methods through a new White Area woodlot disposition.

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Email: Don.Bradshaw@gov.ab.ca

14. Forest Grazing

Forest Grazing guidelines[1] have recently been developed and approved by the Northern East Slopes Regional Director as means for integrating timber harvesting operations on Green Area (grazing) dispositions. These guidelines were proposed by a working group that consisted of the Northern East Slopes Grazing Advisory Committee, as well as representatives from Weyerhaeuser Canada Ltd. (Edson) and Millar Western Industries. The Local Advisory Committees from the MTU programs further reviewed it.

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IRM Examples: Operational Integration Pilots

The guidelines recognize a process for integrating planning, operations and monitoring between the timber and forage resource users. This involves developing a Silviculture-Range Working Plan (SRWP) negotiated and signed between the two resource users and submitted to Alberta Environment for approval and incorporation into the Annual Operating Plan, General Development Plan or Commercial Harvest Plan. A SRWP is a negotiated operational plan to integrate harvesting, silviculture and grazing schedules to ensure sustainable timber, forage and other resource values. A joint field inspection, between the timber company and grazing disposition holder is conducted to ensure the SRWP is implemented and meets the approved management objectives.

Possible mechanisms in the SRWP (to integrate range and timber management objectives) are coordinated agreements, which could cover the following:

- the possible use of rotational or deferred grazing systems (to protect tree seedlings);
- timing of timber operations;
- tailored silvicultural measures;
- special revegetation operations or construction operations; and
- grazing assessments to track forage availability.

Progress to date...

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- These guidelines have been successful in creating a dialogue for integrating timber and forage resources based on consensus and cooperation.

15. Smith-Hondo Local Plan

Agricultural expansion in the white zone will be addressed in the Smith-Hondo plan, which will consider a range of management options and land uses (i.e., ecological, recreational, aesthetic, forest management). Using the Northern East Slopes Sustainable Strategy as a model in construction of the approach, a technical team, equivalent to the integration group, (within the NE Slopes Sustainable Strategy) will provide, for example, an assessment of biophysical data. A coordination group, consisting of Alberta Environment and Municipal district participants, as well as eight stakeholder groups will be responsible for incorporating the community values and needs and for making a final decision on the future land uses. Objectives of the exercise are to produce a final plan (map) with each quarter section assigned a management option designation (i.e., to be sold; to be managed to encourage the provision of various natural amenities, such as wildlife corridor, sustained timber use, etc.).

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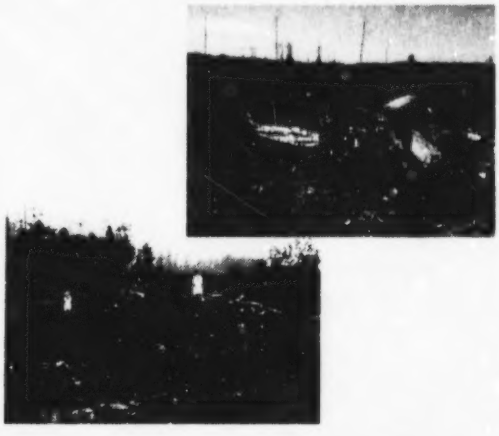

IRM System Components

The definition of IRM suggests that it is a cross-disciplinary and collaborative activity that strives to reconcile various demands by resource users and develop appropriate land management strategy. How does Alberta intend to accomplish IRM and what are components of the current approach? What is the status of work on the components?

The following section will give an update on Alberta IRM components. These are initiatives that are currently taking place in communications and public consultation, monitoring, business plans and research. Projects listed are field based as well as policy refinement examples.

1. Communication and Public Consultation Program

Effective communication is essential to the delivery of programs and services, particularly those that involve a wide range of stakeholders and/or cross government and interdepartmental partnerships.

IRM is based on:

- cooperation, communication, coordination and the comprehensive consideration of all resource values; and
- appropriate consultation before action.

That puts both communications and consultation at the core of IRM itself.

Recognizing this, an IRM Communications Strategy and Framework has been developed to support implementation of integrated resource management across Alberta. It is based on communications at two levels – province-wide and region specific, with province-wide communications implemented at a corporate level and regional communications implemented by Regional Environmental Resource committees. Corporate communications has been designed to gradually build general awareness and understanding within government on a provincial scale.

Active, effective consultation was identified as the most important component of a successful regional strategy (Ideas for Integration Workshop, December 1999).

Regional activities through a prototype focused on awareness, understanding and opportunities for involvement at the regional level. The involvement and support of Communications branches from the other resource developments (Alberta Agriculture, Food and Rural Development; Alberta Economic Development; Alberta Resource Development) also charged with implementing the commitment document, will be crucial.

The IRM Communications Strategy and Framework will ensure that communication efforts are appropriately targeted and consistent with the overall goal and objectives.

The goal of the communications strategy is as follows:

- Target audiences will demonstrate the awareness, understanding and support of Alberta's integrated resource management principles, approach and activities necessary to achieve integrated resource management in Alberta.

Public Consultation

The commitment document states that:

"Resource and environmental decisions shall include consultation. This includes ensuring that:

- decisions on resources and environmental management are taken in a provincial context, considering broad public interest, and involve input from those communities and industries that will be most directly affected by them; and
- a role for provincial and national interests through consultation must also be provided."

Public consultation will be built into regional prototypes to ensure that users of public lands and resources including Aboriginal interests can participate in regional integrated planning processes. The Northern East Slopes regional steering group prototype exemplifies this commitment.

Desired Outcomes for Consultation

Contact: John Shires
Dept/Co: Alberta Environment
Phone: (780) 427-4969
Email: John.Shires@gov.ab.ca

- To identify and understand the perspective and concerns of citizens and communities.
- To obtain advice and input that will expand the information and the options upon which decisions are based.
- To anticipate potential problems and address them before conflicts arise through ongoing public consultation.
- To maximize the benefits and minimize the costs of proposed changes by consulting citizens and communities.
- To promote awareness and understanding with the general public by creating opportunities to learn about and participate in public involvement processes.

2. Monitoring Projects

2.1 Performance Measures

Performance measures on which to assess Alberta's progress on its Commitment to Sustainable Resource and Environmental Management is tied to Canada's commitment to Sustainable Development. At the federal level, the Auditor General has created a Commissioner for the Environment and Sustainable Development.

The role of the Commissioner is to monitor the progress of each federal government department in accordance with their Sustainable Development strategies.

Internationally, Canada has developed the International Institute for Sustainable Development in Winnipeg.

"For development to be sustainable it must integrate environmental stewardship, economic development and the well-being of all people — not just for today but for countless generations to come."

This is the challenge facing governments, non-governmental organizations, private enterprises, communities and individuals.

The International Institute for Sustainable Development meets this challenge by advancing policy recommendations on international trade and investment, economic instruments, climate change, measurement and indicators, and natural resource management to make development sustainable. By using Internet communications, we cover and report on international negotiations and broker knowledge gained through collaborative projects with global partners resulting in more rigorous research, capacity building in developing countries and a better dialogue between North and South.

In addition, Statistics Canada has developed *Human Activity and the Environment 2000*, which includes a number of statistics on Canada's performance towards sustainable development.

IRM System Components

Alberta has commissioned research in the areas of economic, social and ecological sustainability through the Sustainable Forest Management Network and the Foothills model forest.

Websites

Commissioner for the Environment and Sustainable Development
http://www.oag-bvg.gc.ca/domino/cesd_cedd.nsf/html/menu_e.html

International Institute for Sustainable Development
http://iisd1.iisd.ca/

Trade and Investment
</trade/default.htm>

Economic Instruments
</policy.htm>

Climate Change
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Measurement and Indicators
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Natural Resource Management
<nr.htm>

Projects with Global Partners
</k.networks.htm>

Linkages
http://www.iisd.ca/linkages/

Human Activity and the Environment 2000
http://www.statcan.ca/english/ads/11-509-XPE/index.htm

Progress to date...

Contact: Cam McGregor
Dept/Co: Alberta Environment
Phone: (780) 422-4571
Email: Cam.McGregor@gov.ab.ca

- The Integrated Resource Management Division (IRMD) is in the process of developing its operational plan.
- The IRMD is in the process of establishing performance measures to address the Alberta's Commitment to Sustainable Resource and Environmental Management.

2.2 Alberta Forest Biodiversity Monitoring

A cross section of the Alberta forest industry and government agencies have cooperated to develop protocols for biodiversity monitoring, given the current development influences on Alberta landscapes. Specific objectives of the program include identifying how sampling will occur, including spatial arrangement of plots, sampling frequency and method. Other objectives include identifying which terrestrial and aquatic ecosystem attributes will be sampled, issues pertaining to sampling logistics, cost effectiveness, program management and associated statistical standards. Higher standards (statistical confidence) imply greater sampling requirements.

Progress to date...

Contact: Dan Farr
Dept/Co: Foothills Model Forest
Phone: (780) 865-8330
Email: dfarr@telusplanet.net
Website: http://www.fmf.ab.ca/bm.html

- Refer to Appendix C; "Alberta Forest Biodiversity Monitoring, 1999-2000" for a list of publications.

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- Refer to Appendix C; "Alberta Forest Biodiversity Monitoring, 1999-2000" for a list of publications.

2.3 Watershed monitoring: oil and gas development

A memorandum of understanding between NAL resources and Alberta Environment will allow a watershed monitoring study to be conducted, which will include an assessment of land use (oil and gas) activities. This watershed is the site of ongoing work on watershed management and has background information for comparison.

Progress to date...

Contact: John Taggart
Dept/Co: Alberta Environment
Phone: (780) 427-0510
Email: John.Taggart@gov.ab.ca

- Oil and gas activity will proceed.
- Long-term watershed research objectives will be maintained.

3. Promising Research Projects

3.1 Foothills Model Forest

The Foothills Model Forest is part of a network of model forests oriented to the development of sustainable forest management practices. It consists of a variety of forest users and forest interests or partners (among these are Alberta Environment, Natural Resources Canada, Jasper National Park and Weldwood of Canada), and is a laboratory for the development of forest management techniques and knowledge. It is also a site for the promotion of new techniques and information.

Program areas consist of a range of topics under biodiversity (including genetic diversity), species habitat management, ecosystem management, landscape management, socio-economics, forest practices and watershed management themes. Much of the research it does lends itself to integrated forest management practices, which has been adopted by the land managers, which the partnership consists of.

The Foothills Model Forest is also a member of the Yellowhead Ecosystem Working Group, a local forum for discussion of resource management issues.

Progress to date...

Contact: Mark Storie
Dept/Co: Foothills Model Forest
Phone: (780) 865-8332
Email: Mark.Storie@gov.ab.ca

- Only model forest in Alberta.
- A list of publications (for the 1999-2000 year) is given in Appendix C.
- Recipient of the 2000 Premier's Award of Excellence.

3.2 Southern Rockies Landscape Planning Pilot Study

Planning systems for public land and resources currently face many challenges. New management concepts, including adaptive management, demand a more integrated view of the relationship between resource uses and their effects across the landscape. Resource planning must predict and evaluate the cumulative effects of management over broad areas of space and long periods of time. In addition, a clear vision of alternative forest

futures is necessary, so that decision-makers and the public can understand the opportunities, limitations, tradeoffs and impacts of potential management scenarios. In particular, disturbance processes inherently resident in the landscape must be examined if the potential impacts of alternative scenarios are to be adequately understood.

The Southern Rockies Landscape Planning Pilot Study is an interdisciplinary study which addressed the fate of Alberta landscapes altered by a variety of resource development activities. Activities included those associated with recreation, intensive forestry, catastrophic disturbance (large fires), preservation and status quo scenarios. Landscapes for each of these alternatives were simulated for 20 and 50 years into the future, as well as existing conditions (baseline conditions assessment). As indicators of landscape condition, predictions capturing elements of biodiversity, landscape vegetation patterns, fire severity, watershed, visual quality, cultural resources and resource values were made on the 5000 km^2 study area (southwest Alberta). General findings and recommendations of the study are listed in Appendix D.

Progress to date...

Contact: Harry Archibald
Dept/Co: Alberta Environment
Phone: (780) 422-4578
Email: Harry.Archibald@gov.ab.ca

- Contributions to IRM projects: see "general findings of exercise", Appendix D.
- IRM cautionary notes: see "areas requiring attention", Appendix D.
- Framework for IRM projects: see Appendix E.

3.3 Landscape Cumulative Effects Simulator (ALCES)

To integrate resource management options, the potential outcome of various decisions needs to be understood. Ecology seeks to define such relationships with models that predict interactions among various resource (ecosystem) components, such as vegetation, habitat and management activities (disturbance agents) such as forest harvest, oil and gas exploration, road building and urban development. While many models of this nature have already been developed, few ecological models encompass landscapes and the associated land use patterns, and fewer encompass the cumulative impacts of various resource sectors that are directly relevant to Alberta landscapes.

ALCES is a model that allows one to explore these issues in the Alberta context; it was also initially developed for the Al-Pac FMA. Drawing on spatial data from a GIS platform, ALCES depicts relationships and opportunities on a simulated landbase with co-occurring forest management, petroleum development, transportation, agricultural and mining development activity. The response of various ecological components, including aquatic and terrestrial elements can also be simulated, and the implications of various background ecological processes, such as erosion, fire, etc., can be incorporated allowing an exploration of different landuse decisions, scenarios and outcomes.

Some of the models' outputs are as follows:

- long run sustained yield averages (forest management parameter);
- production levels (energy sector);
- landscape features (and fragmentation measures) associated with mine sites, urban development, agricultural fields;
- watershed features (water quality, quantity and streamflow dynamics); and
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- transportation network features.

IRM System Components

Projected use of ALCES is foreseen in the Oldman River Basin and in the Northern East Slopes Sustainable Resource and Environmental Management Strategy. It currently is being funded under federal and provincial programs.

Progress to date...

Contact: Brad Stelfox
Dept/Co: FOREM Consulting
Phone: (403) 949-3008
Email: bstelfox@telusplanet.net

- Profiling issues of cumulative effects.
- Identification of cost-effective mitigation strategies.
- Significant progress in the carbon pool module.
- Significant progress in the wildlife habitat module.

3.4 IRM Research: ARC

To encourage sustainable and environmentally appropriate development, future research at the Alberta Research Council will address integrated management across resource development sectors and ecological components such as air, water, land resources as well as problems in toxicology, human health, animal health and biodiversity. Program areas aim to develop technology, risk assessment techniques and monitoring systems. Partners include universities, government departments as well as other research organizations in Canada and abroad.

Progress to date...

Contact: Malcolm Wilson
Dept/Co: Alberta Research Council
Phone: (780) 450-5210
Email: wilson@arc.ab.ca

- Integrated Resource Management Program. The scope of investigations will encompass land, air, water, health, toxicology and biodiversity.

4. IRM in Business Plans

Most notable this year was the inclusion of Integrated Resource Management in Alberta's newly announced Economic Strategy: *Get Ready Alberta: Strengthening the Alberta Advantage* (www.alberta-canada.com/getready).

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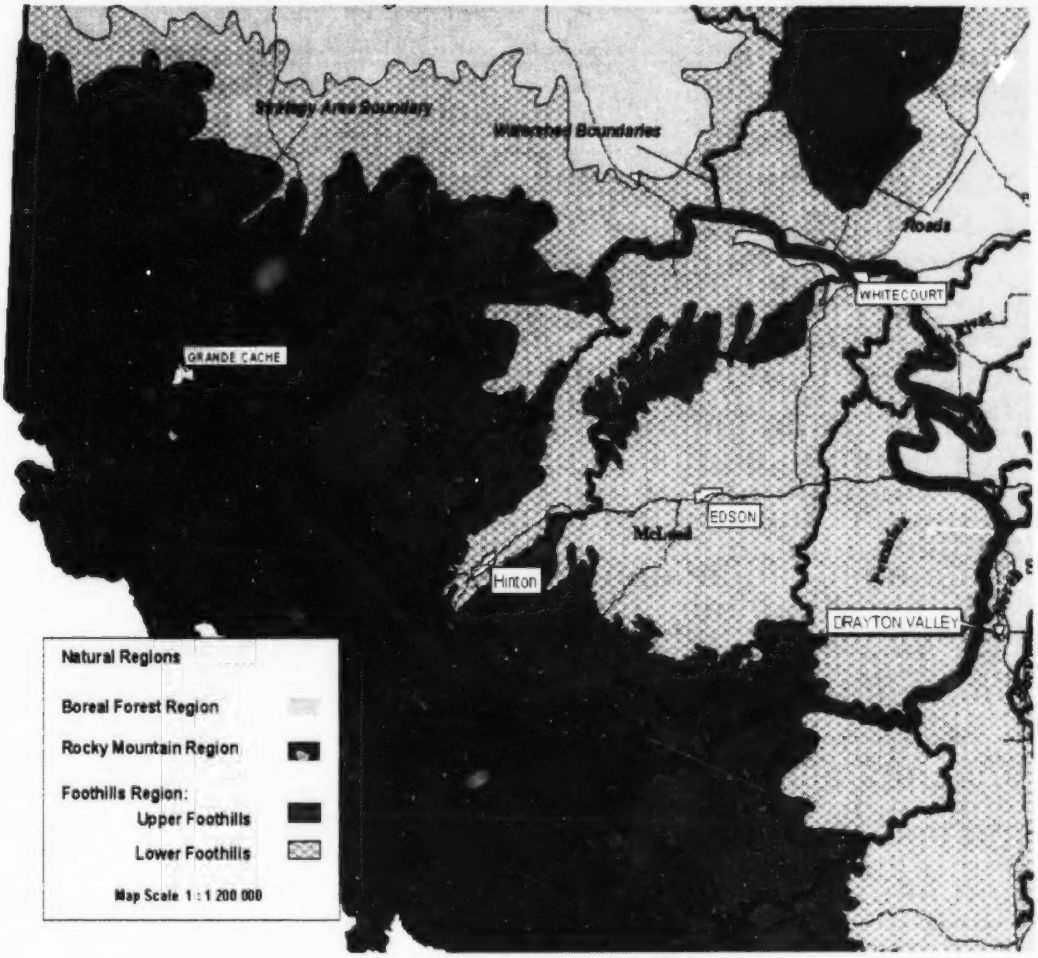
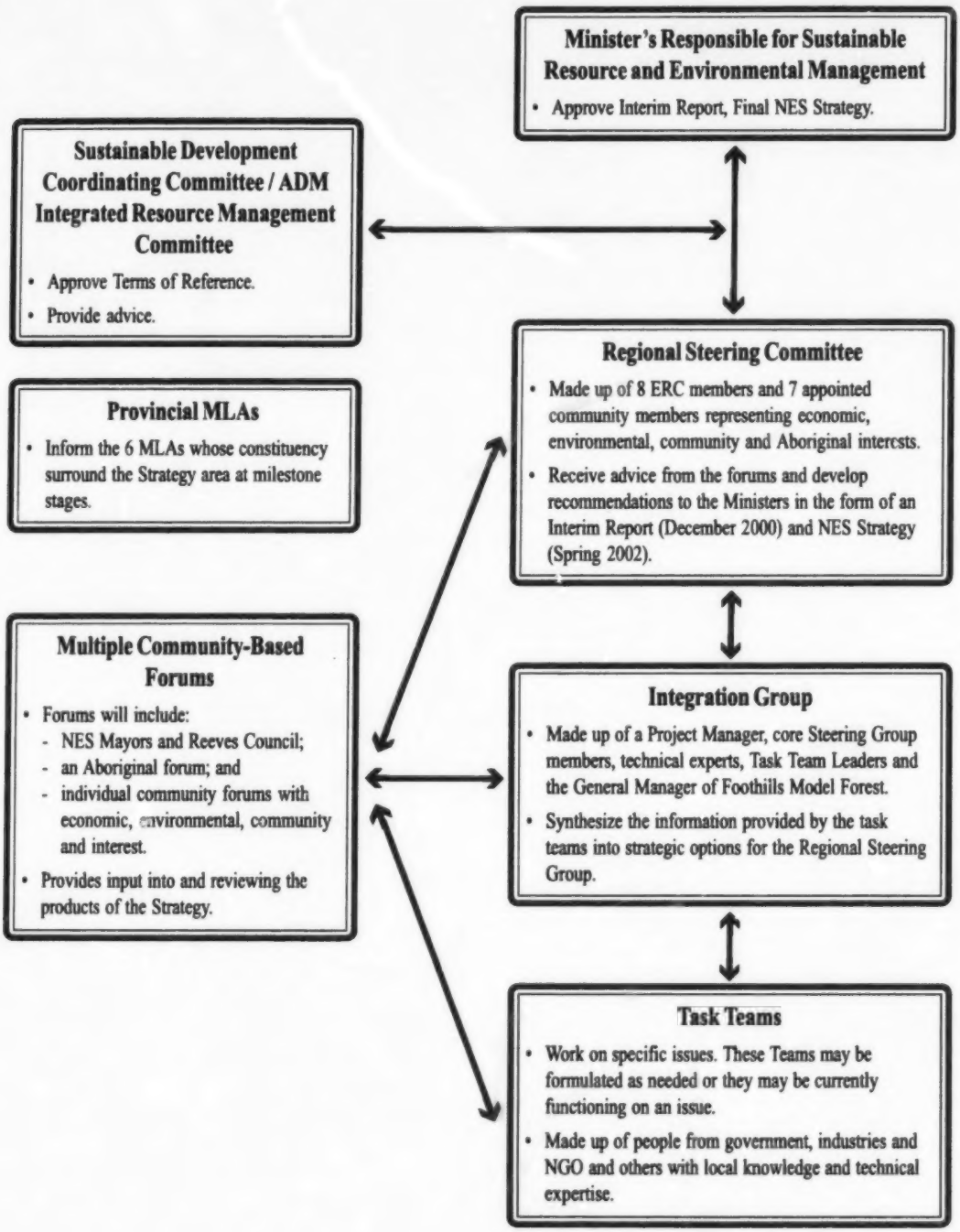
Appendix A


Strategy Area Boundary
Watershed Boundaries
Roads
WHITECOURT
GRANDE CACHE
EDSON
McLeod
Hinton
CRAYTON VALLEY
Natural Regions
Boreal Forest Region
Rocky Mountain Region
Foothills Region:
Upper Foothills
Lower Foothills
Map Scale 1 : 1 200 000

Appendix B


Minister's Responsible for Sustainable Resource and Environmental Management
• Approve Interim Report, Final NES Strategy.
Sustainable Development Coordinating Committee / ADM Integrated Resource Management Committee
• Approve Terms of Reference.
• Provide advice.
Regional Steering Committee
• Made up of 8 ERC members and 7 appointed community members representing economic, environmental, community and Aboriginal interests.
• Receive advice from the forums and develop recommendations to the Ministers in the form of an Interim Report (December 2000) and NES Strategy (Spring 2002).
Provincial MLAs
• Inform the 6 MLAs whose constituency surround the Strategy area at milestone stages.
Multiple Community-Based Forums
• Forums will include:
- NES Mayors and Reeves Council;
- an Aboriginal forum; and
- individual community forums with economic, environmental, community and interest.
• Provides input into and reviewing the products of the Strategy.
Integration Group
• Made up of a Project Manager, core Steering Group members, technical experts, Task Team Leaders and the General Manager of Foothills Model Forest.
• Synthesize the information provided by the task teams into strategic options for the Regional Steering Group.
Task Teams
• Work on specific issues. These Teams may be formulated as needed or they may be currently functioning on an issue.
• Made up of people from government, industries and NGO and others with local knowledge and technical expertise.

Appendix C

Definitions of IRM

Dunster and Dunster (1996): "The management of two or more resources in the same general area and period of time (e.g., water, soil, timber, grazing, fish, wildlife and forests). The process of setting planning and management goals, objectives, strategies and policies in a cooperative framework among all resource users."

BC Forest Practices Code: "The identification and consideration of all resource values including social, economic and environmental needs in land use decision-making. It focuses on resource and land management, and is based on a good knowledge of ecological systems, the capability of the land and the mixture of possible benefits."

Publications

Foothills Model Forest, 1999-2000

Grizzly Bear Management: Validating Existing Cumulative Effects Models. 1999. Julie Dugas and Gordon B. Stenhouse.

Forest Management Note. Camper characteristics and preferences at managed and unmanaged sites in the Foothills Model Forest. July 1999. B.L. McFarlane. M.S. Fisher. P.C. Boxall.

Understanding and Applying Natural Disturbance Patterns on Front Range Landscapes (A Foothills Model Forest Workshop). March 29-30 1999. David Andison, Bandaloop Landscapes — Ecosystem Services and Foothills Model Forest Natural Disturbance Activity Team (website).

Foothills Model Forest Natural Disturbance Workshop. November 24, 1999. Dave Andison. FMF Natural Disturbance Activity Team.

Comparison of Grizzly Bear Telemetry Location Data with a Grizzly Bear Habitat Model. April 1999. John Lee. Gordon Stenhouse.

Forest values and management preferences of two stakeholder groups in the Foothills Model Forest. 1999. B.L. McFarlane. P.C. Boxall.

Detailed Disturbance History Mapping of the Montane, Jasper National Park 1997-1998. 1999. Marie-Pierre Rogeau M.Sc.

Sediment Intrusion and Deposition Near Road Crossings in Small Foothill Streams in West Central Alberta. 1999. Liane C. Spillios.

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Availability of pileated woodpecker cavities and use by other species. 2000. Richard Bonar.

Appendix C

Alberta Forest Biodiversity Monitoring, 1999-2000

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Dickson, E.E., S.E. Franklin and L.M. Moskal. In preparation. Monitoring of forest biodiversity using remote sensing: Stand (high spatial resolution) protocol and examples. University of Calgary, Calgary, Alberta.

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Franklin, S.E. and E.E. Dickson. 1999. Approaches for monitoring landscape composition and pattern using remote sensing. Chapter 2 in Monitoring forest biodiversity in Alberta: Program Framework. Alberta forest biodiversity Monitoring Program Technical Report 3. University of Calgary, Calgary, Alberta.

Gingras, B., C. Paszkowski, G. Scrimgeour and S. Kendall. 1999. Comparison of sampling techniques to monitor stream amphibian communities in forested regions of Alberta. Alberta Research Council, Vegreville, Alberta.

Lee, P. and S. Hanus. 1998. Criteria and indicators for monitoring biodiversity in Alberta's forests: Part I: Review of legislation, policies, external agreements, and programs. Progress completion report prepared for Alberta Environmental Protection by the Alberta Research Council, Vegreville, Alberta. 123 pp. Available http://www.gov.ab.ca/env/resedu/biodiversity.html.

Lee, P. and S. Hanus. 1999. Fulfilment of existing legislation, provincial policies, and external agreements by the Alberta Forest biodiversity Monitoring Program. Appendix 1 in Monitoring forest biodiversity in Alberta: Program Framework. Alberta forest biodiversity in Alberta: Program Framework. Alberta Forestry Biodiversity Monitoring Technical Report 3. Alberta Research Council, Vegreville, Alberta.

Lee, P., and S. Hanus. 1999. Terrestrial vegetation and forest structure monitoring in forested regions of Alberta: background, indicators, and protocols. Chapter 4 in Monitoring forest biodiversity in Alberta. Program Framework. Alberta Forest Biodiversity Monitoring Program Technical Report 3. Alberta Research Council, Vegreville, Alberta.

Lee, P., and S. Hanus, K. Sturgess, L. Tomyn, and J. Joy. In preparation. Test of field procedures for terrestrial ground plots. Alberta Research Council, Vegreville, Alberta.

Lee, P. And M. Herbut. 2000. Ecological land class and benchmark representation for different sampling networks in the Alberta Forest biodiversity Monitoring Program. Alberta Research Council, Vegreville, Alberta.

Appendix C

Scrimgeour, G., and S. Kendall, 1999. Identification of aquatic elements and sampling protocols: Annotated bibliography. Appendix 5 in Monitoring forest biodiversity in Alberta: Program Framework. Alberta Forest Biodiversity Monitoring Program Technical Report 3. Alberta Research Council, Vegreville, Alberta.

Scrimgeour, G., and S. Kendall, 1999. Identification of aquatic elements and sampling protocols: List and evaluation of potential elements and protocols to be measured in Alberta and Saskatchewan. Chapter 3 in Monitoring forest biodiversity in Alberta: Program Framework. Alberta Forest Biodiversity Monitoring Program Technical Report 3. Alberta Research Council, Vegreville, Alberta.

Shank, C.C. and D.R. Farr. 1999. Proposed protocols for monitoring terrestrial vertebrates. Chapter 6 in Monitoring forest biodiversity in Alberta: Program Framework. Alberta Forest Biodiversity Monitoring Program Technical Report 3.

Winchester, N.N. 1999. Identification of potential monitored elements and sampling protocols for terrestrial arthropods. Chapter 5 in Monitoring forest biodiversity in Alberta: Program Framework. Alberta Forest Biodiversity Monitoring Program Technical Report 3.

Appendix D

Southern Rockies Landscape Planning Pilot Study: Recommendations

Model Predictions: general findings of exercise

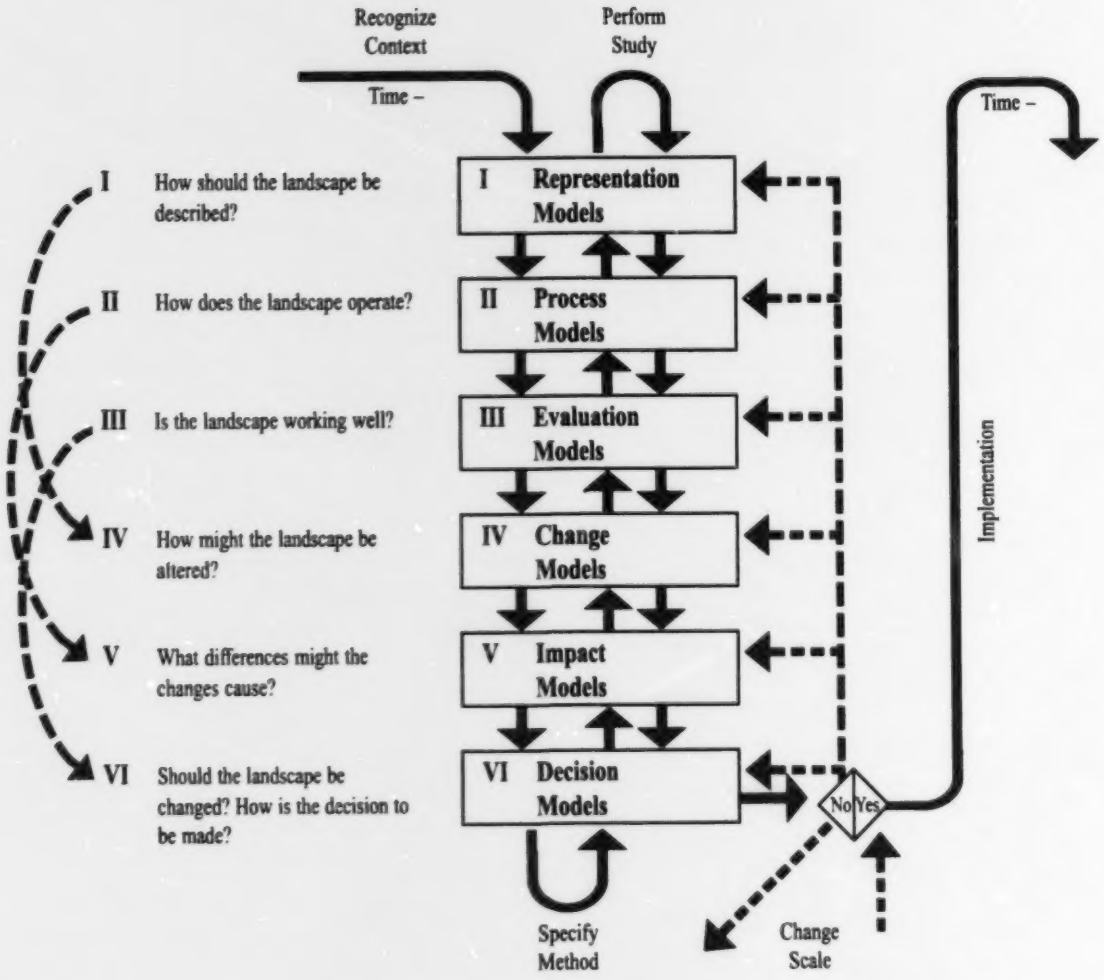
- Broad scale, long-term perspectives recommended.
- Recommended framework for project organization: see Appendix E.
- Spatial Hierarchy (coarse to fine resolution): Region, Landscape Management Unit, Watershed Sub-Basins, Landscape Compartments, Ecosite Phase.
- Ecosite phase: used as common spatial vocabulary for subsequent predictions, including succession projections as well as inputs for various models. A variety of coverages was required to map out the ecosite phases; there were soils, AVI, topographic and watershed coverages, Landsat/TM data.
- Existing landscape pattern used as baseline for pattern analysis; also used for objective setting (resource development activity and understanding disturbance regime, watershed processes and species specific projections).
- Base data requirements: Ecosite Phase, AVI, Topographic DEM, watershed coverage, access and facilities coverage, timber harvest schedule and associated access routes, soils coverage.
- Potential grizzly bear foraging area suitability was important project byproduct.
- Avian diversity should be modelled as it was found to be affected by changing landscape attributes.
- Unique and rare species requirements should be modelled; this will help guide "fine filter" (species specific) management effort, if required at a later date.
- WRENSS useful for small watersheds and should be used to interdisciplinary exercises such as this.
- Should re-examine IWAP (watershed model) peak flow predictions.
- Visual assessment was considered important task.
- Very large dataset is required.
- WRENSS should be used (incorporated) when >10% of watershed basin is affected by forest harvest.

Areas requiring attention

- AVI data from this study area require improvement.
- Timber Growth and Yield predictions, for area, problematic due to data set restrictions.
- G&Y relationship to ecosite classification, for area, difficult to establish due to dataset restrictions.
- A combination of ecosite phase and forest cover maps were required for derivation of certain model variables (moose browse, avian biodiversity drivers).
- Field work to capture disturbance regime (fire) frequencies considered difficult at acceptable cost.
- Fish species were not modelled and certain habitat variables (stream morphology) not possible to derive due to lack of input data.
- Human use variables not available (i.e., traffic volume); therefore certain assumptions made about access infrastructure could be questioned.

Appendix E

The Framework (Steinliz, 1990)



Suggested structure (generalized framework) of IRM projects (Alberta Environmental Protection 1999)